Transboundary Dissolved Gas Modeling Paper Strawman Outline

Objectives of the System Model

- Capability to perform an integrated assessment of the impacts of total dissolved gas on the Columbia Basin ecosystem
- Capability to inform decision makers on the performance of operational and structural dissolved gas abatement alternatives in order to prioritize mitigation activities
- Capability to simulate the fate and transport of dissolved gas through the Columbia Basin system
- Capability to simulate ecological exposures and habitat impacts

Elements of a Dissolved Gas Modeling Approach and Alternatives Analysis

Geographic scales

Basin wide

Main Stems Only?

Key Tributaries (ie, Clearwater)

Output resolution (1 mile?, 1 foot?)

Time scales

Seconds, hours, days

Data requirements

Bathymetry

Hydrology

meteorology

Project operations

Calibration and verification

Determine degree of model reliability needed – calibration and verification issues

Data needs may be reduced if higher uncertainties are allowed

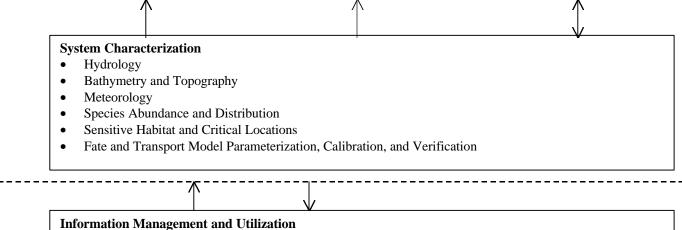
• Develop dissolved gas generation relationships for each project

Existing

Abatement alternatives

- Determine Model Output Requirements
- Develop and Perform a baseline System Assessment
- Develop and Perform Gas Abatement Alternatives Assessments
- Uncertainty and Risk Analysis
- Time and Cost Estimate to develop a system gas model, perform baseline assessment, and alternatives assessment

System Configuration, **Fate and Transport Impact Evaluation** System Operation, and **Project Contributions TDG Generation** System Trends Configuration Model Dimensionality **Exceed Standard Projects** Hydrodynamics **Species Mortality** Operation Dissolved Gas Transport Species Abundance **Existing Operations** Temperature Species Diversity Target Flows **Biological Exposure** Species Distribution Operations to Reduce Behavioral Modification **TDG** Exposure Power Generation Habitat **TDG** Generation Species Existing Source term Uncertainty Alternative Structures



- Identify Data Sources and Determine Availability
- Establish WWW site with Links to Appropriate Data Sources
- Data Mining
- Data Quality Assessment
- Data/Information Dissemination

Figure 1. Conceptual Model – Columbia Basin TDG System Modeling

Discussion of Modeling Approach Items

Information Gaps

Data needed to implement modeling approach.

Research Needs

Examples: Mechanistic models of gas generation at structures, air/water gas exchange data for the Columbia,

Summary and Recommendations